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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,146	09/12/2003	John D. Grace	1145-001C1	6794

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EXAMINER	
TAYLOR, VICTOR J	
ART UNIT	**PAPER NUMBER**
2863	

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/661,146	GRACE, JOHN D.	
	Examiner	Art Unit	
	Victor J. Taylor	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☒ Other: *Office Action*.

DETAILED ACTION

Drawings

1. The corrected or substitute drawings were received on 9 December 2003. These drawings are approved.

Prior Art

2. The prior art made of record and not relied upon is considered pertinent to applicant;

I. Divies et al., US 5,953,680 in class 702/005 is cited for the method of creating the 2-D model of geological basins by using the imbricate structure EK in figure 2 and the initial cell elements Mi, formed in the bank Bj, using nodes N2, and N3 as found in lines 25-45 of column 3.

II. Hornbuckle, US 6,012,018 in class 702/016 is cited for the presentation and the processing of the sub-volumes of 3-D seismic data 62 in figure 3, and using the surfaces application 92 with the processor 84, and the computer system 86 in figure 6, processed in combination with the Cube software as found in line 50 of column 3.

III. Lee, US 6,307,555 in class 345/423 is cited for the processing of polygons and the positioning of meshes 102 in figure 2 by using the pseudo-code algorithm in lines 7-20 of column 11 and the computer system 500 as found in line 65 of column 18.

IV. Gueziec, US 6,285,805 in class 382/299 is cited for the 2D and 3D polygonal model processing. See entire patent.

V. Sato et al., US 5,675,720 in class 345/419 is cited for the point processing of models in convex polyhedron form. See entire patent

Claim R jections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) The invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Gueziec et al., in US 6,031,548.

With regard to claim 1, Gueziec et al., discloses "the field of computer GIS graphics and, in particular, to methods for progressively displaying or transmitting a triangular mesh" in line 16 of column 1 of irregular volume in the 3D polygonal model.

Gueziec et al., further discloses that the 3D "Polygonal surfaces are widely used for representing three dimensional (3-D) geometric models. Such surfaces consist of a plurality of polygons, which are cycles of vertices, whose coordinates are generally expressed in a modeling space coordinate system. The polygonal surfaces may be used for generating pictures and animations, and may also be used in Computer Aided Design (CAD) systems, in scientific visualization, and in medical imaging" in line 25 of column 1 that comprises a GIS platform.

Gueziec et al., further discloses a plurality of techniques wherein the "first method provides a general framework to represent changes in a triangular mesh {the irregular volume within the platform} in a compressed form, while the second method is better suited for use when the resolution of the mesh changes dramatically during the progressive transmission (for example when the number of vertices of the highest

resolution mesh is more than a hundred times the number of vertices of the lowest resolution mesh), wherein sending the full resolution connectivity may be too costly. Furthermore, the third method can be used to advantage when the resolution of the mesh does not change dramatically (for example when the number of vertices in the high resolution mesh is less than ten times the number of vertices in the low resolution mesh)" in line 45 of column 7 and discloses attribute data for the high resolution mesh in the data files in lines 5-35 of column 7.

Gueziec et al., further discloses a plurality of techniques wherein the "transitioning between non-adjacent levels of detail (i.e., enables one or more levels to be skipped), as well transitioning between adjacent levels of detail. Further in this regard, the representation in accordance with this invention is compatible with smooth transitions, or "geo-morphs", between levels of detail. When detail is added to the triangular mesh by lowering the LOD from L+1 to L the vertices of Level L are introduced in the mesh. All added vertices have a representative in the lower level of detail mesh. Firstly, the new triangles are determined as explained above, but for the new vertices (vertices of Level L), the coordinates of their representative are used first, which results in a mesh that is geometrically the same as the Level L +1 mesh. Then, gradually, the coordinates are interpolated linearly from that position to the coordinates of the new vertices using a parameter A, that varies between 0 and 1, e.g., 0.1, 0.2, etc. and in the geometric coordinates and new vertices and coordinate interpolated linearly in the polygonal model" in line 35-55 of column 11 comprising the attribute data of the triangle volume.

Gueziec et al., further discloses a plurality of techniques wherein the 3D irregular volume within a polygonal model is displayed in the 3D graphical display interface using the computer system 50 and discloses using the network for progressive transmission of the polygonal and provides for the display of the graphical polygonal surfaces as disclosed in "The hardware unit 63 includes one or more central processing units (CPU) 65, a random access memory (RAM) 64, and an input/output interface 66. Microinstruction code 62, for instance a reduced instruction set, may also be included on the platform 60. Various peripheral components may be connected to the computer platform 60, including a graphical interface or terminal and user interface 70, a data storage device 71, and a printing device 72. A network interface 74 (such as a modem) provides a connection to a network 76 for enabling the progressive transmission and display of polygonal surfaces in accordance with an aspect of this invention. An operating system 61 coordinates the operation of the various components of the computer system 50. An example of computer system 50 is the IBM RISC System/6000 (RISC System/6000 is a trademark of the International Business Machines Corporation.) It is readily understood that those skilled in the computer arts will be familiar with many equivalent computer systems 50, and the teachings of this invention are not intended to be limited for use with any one particular type of computer or computer architecture" in lines 10-35 of column 17. He further discloses the "technique for partitioning a surface in Levels of Detail (LOD), by using the output of any suitable algorithm that performs edge collapses on a surface. For global LOD, disclosing that the representation is comprised of a batch of surface portions, each surface portion being

represented with point positions and an indexed face set. Each surface portion corresponds to an increment from one level of detail to the next. In addition, an array of vertex representatives is provided and vertex indices are replaced with their representatives before display. Also described is an exemplary implementation of this representation in VRML" in lines 40-47 of column 17. The document discloses a simple and efficient framework for the progressive transmission and display of polygonal surfaces in the GIS platform see line 37-57 of column 17.

As to claim 2, Gueziec et al., further discloses the 3D "Polygonal surfaces are widely used for representing three dimensional (3-D) geometric models in line 25 of column 1.

As to claim 3, Gueziec et al., further discloses the limitation of the triangular mesh using a succession of edge collapse for textural overlay in lines 10-25 of column 15 comprising the wire framed 3D polygonal model in addition to using the spatial data, the 3D Mesh modeling systems also use the texture data to display and reproduce an object. And the texture data is color and pattern information data that replicates an object's surface features. Typically the 3D object modeling systems maintain the texture data separately from the "wire frame" mesh and apply the texture data when rendering the surface features. Thus, the object modeling systems typically include two distinct and separate processes. First in a building phase, the system constructs a "wire frame" mesh to represent the object's spatial structure by using only 3D X, Y, Z values and, second, during a rendering phase, the system applies the texture data to output a display or reproduction. Thus the "Texture mapping" or "texturing" is the part of the

rendering phase processes that overlay the texture data on the geometric faces of a mesh model. For example the rough face of a brick, the smooth and reflective surface of a mirror and the details of a product label can all be overlaid onto a mesh wire frame model by using the texture mapping principles.

As to claim 4, Gueziec et al., further discloses the limitation of "special analytical techniques" in the extracted triangle 3D modeling step 2400 in figure 4 configurable as space triangle processed by the computer technique.

As to claim 5, Gueziec et al., further discloses the limitation of "querying technique" in the input/output interface and microinstruction code of the computer 62 with graphical interface in lines 10-20 of column 17.

As to claim 6, Gueziec et al., further discloses the limitation of "exact boundaries" in the edge collapse specification performed in a different order in the polygonal model comprising variance in edge boundaries that are not exact in line 40-50 of column 14.

As to claim 7, Gueziec et al., further discloses the limitation of the "model associated with attribute data and discloses the table of attributes" data in lines 5-35 of column 7.

As to claim 8 and claim 9, Gueziec et al., further discloses the limitations of "estimating clipping, constructing, and joining attributes to said 3D polygonal model in figures 10, 11, and 12 particularly the processing steps of the polygonal data and GIS display disclosed in lines 1-55 of column 17. The arguments applied to claim 1, which are common to claim 8 are applied to claim 8 including the model processing features.

As to claim 10, Gueziec et al., further discloses the limitations of a plurality of geometric models including the geosciences models found in lines 30-40 of column 1.

With regard to claim 11, Gueziec et al., discloses the limitations of "estimating clipping, constructing, and the joining attributes to said 3D polygonal model in figures 10, 11, and 12 and discloses the processing steps of the polygonal data and the GIS display as disclosed in lines 1-55 of column 17.

The arguments applied to claim 1 are applied to claim 11 for their common features.

In addition Gueziec et al., further discloses "the field of computer GIS graphics and, in particular, to methods for progressively displaying or transmitting a triangular mesh" in line 16 of column 1 of irregular volume in the 3D polygonal model.

Gueziec et al., further discloses that the 3D "Polygonal surfaces are widely used for representing three dimensional (3-D) geometric models. Such surfaces consist of a plurality of polygons, which are cycles of vertices, whose coordinates are generally expressed in a modeling space coordinate system. The polygonal surfaces may be used for generating pictures and animations, and may also be used in Computer Aided Design (CAD) systems, in scientific visualization, and in medical imaging" in line 25 of column 1 that comprises a GIS platform.

Gueziec et al., further discloses a plurality of techniques wherein the "first method provides a general framework to represent changes in a triangular mesh {the irregular volume within the platform} in a compressed form, while the second method is better suited for use when the resolution of the mesh changes dramatically during the

progressive transmission (for example when the number of vertices of the highest resolution mesh is more than a hundred times the number of vertices of the lowest resolution mesh), wherein sending the full resolution connectivity may be too costly. Furthermore, the third method can be used to advantage when the resolution of the mesh does not change dramatically (for example when the number of vertices in the high resolution mesh is less than ten times the number of vertices in the low resolution mesh)" in line 45 of column 7 and discloses attribute data for the high resolution mesh in the data files in lines 5-35 of column 7.

Gueziec et al., further discloses a plurality of techniques wherein the "transitioning between non-adjacent levels of detail (i.e., enables one or more levels to be skipped), as well transitioning between adjacent levels of detail. Further in this regard, the representation in accordance with this invention is compatible with smooth transitions, or "geo-morphs", between levels of detail. When detail is added to the triangular mesh by lowering the LOD from L+1 to L the vertices of Level L are introduced in the mesh. All added vertices have a representative in the lower level of detail mesh. Firstly, the new triangles are determined as explained above, but for the new vertices (vertices of Level L), the coordinates of their representative are used first, which results in a mesh that is geometrically the same as the Level L +1 mesh. Then, gradually, the coordinates are interpolated linearly from that position to the coordinates of the new vertices using a parameter A, that varies between 0 and 1, e.g., 0.1, 0.2, etc. and in the geometric coordinates and new vertices and coordinate interpolated linearly

in the polygonal model" in line 35-55 of column 11 comprising the attribute data of the triangle volume.

Gueziec et al., further discloses a plurality of techniques wherein the 3D irregular volume within a polygonal model is displayed in the 3D graphical display interface using the computer system 50 and discloses using the network for progressive transmission of the polygonal and provides for the display of the graphical polygonal surfaces as disclosed in "The hardware unit 63 includes one or more central processing units (CPU) 65, a random access memory (RAM) 64, and an input/output interface 66. Microinstruction code 62, for instance a reduced instruction set, may also be included on the platform 60. Various peripheral components may be connected to the computer platform 60, including a graphical interface or terminal and user interface 70, a data storage device 71, and a printing device 72. A network interface 74 (such as a modem) provides a connection to a network 76 for enabling the progressive transmission and display of polygonal surfaces in accordance with an aspect of this invention. An operating system 61 coordinates the operation of the various components of the computer system 50. An example of computer system 50 is the IBM RISC System/6000 (RISC System/6000 is a trademark of the International Business Machines Corporation.) It is readily understood that those skilled in the computer arts will be familiar with many equivalent computer systems 50, and the teachings of this invention are not intended to be limited for use with any one particular type of computer or computer architecture" in lines 10-35 of column 17. He further discloses the "technique for partitioning a surface in Levels of Detail (LOD), by using the output of any suitable

algorithm that performs edge collapses on a surface. For global LOD, disclosing that the representation is comprised of a batch of surface portions, each surface portion being represented with point positions and an indexed face set. Each surface portion corresponds to an increment from one level of detail to the next. In addition, an array of vertex representatives is provided and vertex indices are replaced with their representatives before display. Also described is an exemplary implementation of this representation in VRML" in lines 40-47 of column 17. The document discloses a simple and efficient framework for the progressive transmission and display of polygonal surfaces in the GIS platform see line 37-57 of column 17.

With regard to claim 12, which differs from claim 11 in the additional limitation of constructing the multi patches step. Gueziec et al., further discloses this limitation in the computer processing of the VRML software using the node structure to down load the threads as found in lines 1-67 in column 15, 16 and 17

The arguments applied to claim 1 and 11 are applied to claim 12 for their common features.

In addition Gueziec et al., further discloses the limitations of "estimating, clipping, constructing, and joining the attributes to the said 3D polygonal model in figures 10, 11, and 12 and discloses these processing steps of the polygonal data and GIS display disclosed in lines 1-55 of column 17.

As to claim 13, Gueziec et al., further discloses the limitation of the 3D "Polygonal surfaces used for representing three dimensional (3-D) geometric models in line 25 of column 1 and discloses generating a triangulation mesh in line 18 of column 5

and discloses the addition each triangle batch in element 1500 in figure comprising the reading of the vertex index and joining the data in the processing of figure 5.

As to claim 14, Gueziec et al., further discloses the well know and widely used polygonal surfaces for representing 3-D geometric models in line 18 of column 1 by using the GIS system and the polygonal models and the discloses geometric models as defined by triangle meshes in line 44 and further discloses the 3D polygonal triangular mesh model in line 65 of column 4.

As to claim 15, Gueziec et al., further discloses the limitation of "special analytical techniques" in the extracted triangle 3D modeling step 2400 in figure 4 configurable as space triangle processed by the computer technique.

As to claim 16, Gueziec et al., further discloses the limitation of Gueziec et al., further discloses the limitation of the "querying technique" in the input/output interface and microinstruction code of the computer 62 with the graphical interface comprising spatial technique in lines 10-20 of column 17.

With regard to claim 17, Gueziec et al., discloses the limitations of "estimating clipping, constructing, and the joining attributes to said 3D polygonal model in figures 10, 11, and 12 and discloses the processing steps of the polygonal data and the GIS display as disclosed in lines 1-55 of column 17.

Gueziec et al., further discloses the limitations of the 3D "Polygonal surfaces are used for representing the three dimensional (3-D) geometric models found in line 25 of column 1, and discloses joining by generating a triangulation mesh in line 18 of column

5 and discloses the addition each triangle batch in element 1500 in figure comprising the reading of the vertex index and joining the data in the processing of figure 5.

The arguments applied to claim 1 are applied to claim 17 for their common features.

In addition Gueziec et al., further discloses "the field of computer GIS graphics and, in particular, the methods for progressively displaying or transmitting a triangular mesh" [found in line 16 of column 1], of irregular volume in the 3D polygonal model.

Gueziec et al., further discloses that the 3D "Polygonal surfaces are widely used for representing the three dimensional (3-D) geometric models. Such surfaces consist of a plurality of polygons, which are cycles of vertices, whose coordinates are generally expressed in a modeling space coordinate system. The polygonal surfaces may be used for generating pictures and animations, and may also be used in Computer Aided Design (CAD) systems, in scientific visualization, and in medical imaging" in line 25 of column 1 that comprises a GIS platform.

As to claim 18, Gueziec et al., further discloses "the well know and widely used polygonal surfaces" for representing the 3-D geometric models in line 18 of column 1 by using the GIS system and the polygonal models and discloses the geometric models defined by the triangle meshes in line 44 and further discloses the 3D polygonal triangular mesh model in line 65 of column 4.

As to claim 19, Gueziec et al., further discloses the limitation of Gueziec et al., further discloses the limitation of "special analytical techniques" in the extracted triangle

3D modeling step 2400 in figure 4 configurable as space triangle processed by the computer technique.

As to claim 20, Gueziec et al., further discloses the limitation of Gueziec et al., further discloses the limitation of Gueziec et al., further discloses the limitation of the "querying technique" in the input/output interface and microinstruction code of the computer 62 with the graphical interface comprising spatial technique in lines 10-20 of column 17.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor J. Taylor whose telephone number is 571-272-2281. The examiner can normally be reached on 8:00 to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on 571-272-2863. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

6. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

VJT.

10 June 2004.

JEBarlow

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